



W.Q. LIB
SEVERN R. (22)



THE
ONTARIO WATER RESOURCES
COMMISSION
WATER POLLUTION SURVEY
of the
TOWNSHIP OF NORTH GWILLIMBURY
COUNTY OF YORK

TOWNSHIP OF
COUNTY OF YORK 1966

1966

TD
380
.N67
1966
MOE

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at copyright@ontario.ca

TD
380
.N67
1966

Report on a water pollution
survey of the township of North
Gwillimbury, county of York.

80501

REPORT

on a

MUNICIPAL WATER POLLUTION SURVEY

of the

TOWNSHIP OF NORTH GWILLIMBURY

County of York

February 1966

Division of Sanitary Engineering

The Ontario Water Resources Commission

INDEX

	<u>PAGE NO.</u>
INTRODUCTION	1
I GENERAL	1
Soil Conditions	2
Drainage	3
II WATER USES	3
(1) Municipal Water System	3
(2) Private Water Systems	4
(a) Clarlyn Lodge Water Works System	4
(b) Clark Water Works System	4
(c) Mason Water Works System	5
(3) Recreational Uses	6
III WATER POLLUTION	6
(1) Sanitary Waste Disposal	6
(2) Proposed Sewage Disposal System	7
(3) Refuse Disposal	8
IV DISCUSSION OF SAMPLE ANALYSES	8
V CONCLUSIONS	9
VI SUMMARY	9
VII RECOMMENDATIONS	10
GLOSSARY OF TERMS	
WATER QUALITY AND EFFLUENT OBJECTIVES	
TABLE I - Lake Simcoe Sample Results	
TABLE II - Maskinonge and Black Rivers Sample Results	
TABLE III - Outfall Location	
MAP	

THE ONTARIO WATER RESOURCES COMMISSION

REPORT

INTRODUCTION

The field investigations for a water pollution survey of the Township of North Gwillimbury were performed on August 31 and September 2, 1965. The purpose of this survey was to locate and record all significant sources of water pollution within the township. Surveys of this nature are conducted routinely and upon request throughout the Province of Ontario by the Ontario Water Resources Commission as a basis for evaluating any existing or potential sources of pollution.

Recommendations are made pertaining to water pollution abatement and the Commission expects that corrective measures will be taken by those concerned.

The Commission is grateful for the co-operation received from the York County Health Unit and the municipal officials.

I. GENERAL

The Township of North Gwillimbury is the smallest township in the County of York with an area of 29,011 acres. The township is bordered on the west and north by Cook Bay and Lake Simcoe and on the east and south by the Township of Georgina and the Township of East Gwillimbury.

Summer cottages and year-round residences predominate the shoreline of the township. Aside from the lakeside area, the

municipality remains primarily rural. The 1964 assessed population according to the Ontario Department of Municipal Affairs 1965 Municipal Directory was 5,802.

Soil Conditions

A brief description of the township's top soil resources gained from Report No. 19 of the Ontario Soil Survey, Soil Survey of York County, by the Experimental Farms Service, Canada Department of Agriculture and the Ontario Agricultural College is presented. The top soils predominating in the Township of North Gwillimbury and the respective drainage qualities of each are as follows:

Granby Sandy Loam - topography is smooth and very gently sloping to level affording very slow drainage. Percolation is very poor probably due to a high water table.

Otonabee - characterized by smooth moderately sloping to hilly topography. The soil is well drained due to free percolation and good runoff.

Sargent Sandy Loam - occurs in North Gwillimbury and Georgina townships and is developed in calcareous gravelly materials. The topography is smooth gently sloping and erosion is slight. Because of coarse, open materials drainage and percolation is good.

Tecumseth Sandy Loam - is characteristic of the Grey-Brown Podzolic soils. It is imperfectly drained as water will percolate at a fair rate through the profile but runoff is low. The

topography is smooth and very gently sloping. Erosion is slight except where inadequate cover allows soil loss by wind to occur.

Emily Loam - is imperfectly drained, water percolation is moderate and runoff is slow.

Jeddo Clay Loam - is poorly drained. In some areas the till has been intermixed with lacustrine material. The topography is smooth and very gently sloping.

Muck - usually occurs on depressional topography. The drainage is very poor and often muck land is under water for part of the season.

Drainage

The Township of North Gwillimbury is drained by the Maskinonge (Jersey River) and Black rivers which empty into Lake Simcoe.

The township has experienced little or no industrial development. Essentially the economy depends on business and farming enterprises.

II WATER USES

(1) Municipal Water System

Presently there is no municipally owned water works system serving the residents of the Township of North Gwillimbury. Municipal authorities are giving consideration to the water works requirements for the Keswick area.

(2) Private Water Systems

There are three private water works systems in the township and these will be discussed under their proper designation.

(a) Clarlyn Lodge Water Works System

This water works is owned by Mr. Clark Martin. Water from a spring is collected in a concrete basin and flows by gravity to five summer cottages and a 600 gallon concrete reservoir. Water is pumped from the reservoir to Clarlyn Lodge. The water receives no treatment and is not metered.

At the time of the last OWRC inspection on May 12, 1965, the maintenance and operation of the water system appeared satisfactory. It has been recommended that the owner collect one sample from the spring and two samples from the distribution system and submit these to the Ontario Water Resources Commission Laboratory for bacteriological examination.

(b) Clark Water Works System

This water works is owned by Mr. G. Clark, and is comprised of four distribution systems. Each system is supplied by one or two drilled wells. These systems are normally operated individually but all possess interconnections which can be utilized during periods of high water consumption.

The following areas are served; Beverly Hills, Beverly Isles, Miami Beach and Hillcrest. Each system is provided with a storage reservoir and chlorination treatment facilities. Mechanical aeration

is provided at the Hillcrest reservoir for the oxidation of iron.

As a result of the excessive number of adverse bacteriological samples collected from the Miami Beach distribution system it was recommended that a minimum chlorine residual of 0.5 ppm be maintained in the water leaving this pumphouse. The bacteriological quality of the three remaining systems was satisfactory.

Approximately 40 per cent of the 900 water users are permanent residents.

(c) Mason Water Works System

Mr.B. Mason is the owner of this water works. Water from an overflowing well is collected in a reservoir and pumped to the distribution system. The number of water users is unknown. No treatment is provided and the supply is not metered.

Complaints have been received regarding the staining of fixtures and iron depositions in pipes attributable to the excessive concentrations of iron in the water. The residents have expressed an interest in sharing the cost of providing treatment for iron removal. This treatment could probably be best applied at the pumphouse in preference to the installation of individual water softeners. A water softener installed in the home of one of the consumers indicated satisfactory iron removal qualities. However, iron removal at the pumphouse would prevent the possible growth of iron bacteria and deposition of iron in the water mains.

Analysis of samples collected for bacteriological examination reveal the water to be of satisfactory quality.

(3) Recreational Uses

The waters of Cook Bay and Lake Simcoe provide a very attractive facility for water sports of all sorts. This water use is dependent on the quality of these waters being maintained at a satisfactory level, therefore every effort should be made to prevent water impairment.

III WATER POLLUTION

(1) Sanitary Waste Disposal

Sanitary sewage from the individual homes in the municipality is disposed of by means of private individual sewage disposal systems. The main system employed is the septic tank and subsurface tile bed. Officials of the York County Health Unit reported receiving very few complaints regarding these systems. Septic tank and subsurface tile beds installed in depressed areas along the shoreline have presented problems resulting from a high water table which affords very poor drainage. It should be noted that it is the responsibility of the individual to insure that his private sewage disposal system is functioning satisfactorily.

Based on the information gained from the discussion on the top soil resources of the township it would appear that a large percentage of surface area contains a type of top soil that does not provide adequate absorption of sewage. Therefore continued development

may necessitate the construction of a communal sewage works where soil conditions prohibit the installation of septic tank and sub-surface tile bed systems.

(2) Proposed Sewage Disposal System

During the year 1964 Appendix "E" of the proposed Official Plan for the Township of North Gwillimbury, prepared by Project Planning Associates Limited was submitted to this Commission for comment. The appendix dealt with the possible future provision of a sewage disposal system for the municipality. Two alternative preliminary proposals were submitted.

Proposal 1 discussed the general location of trunk sewers, trunk mains and treatment facilities in the community of Keswick. The effluent was to be discharged to the Maskinonge River.

Proposal 2 suggested serving the same area but locating the treatment facilities on the southern tip of Cook Bay. The report suggested that a higher degree of treatment efficiency would be required from the plant located on the Maskinonge River than the one located on Cook Bay.

Comments were offered by the OWRC on this proposal in a letter dated May 15, 1964. The need for municipal sewage facilities to prevent water pollution in densely populated areas is recognized. The exact type and location of the treatment plant required would not be determined by economics alone. The degree of treatment would depend on the associated effects on water quality and present water

use practices.

(3) Refuse Disposal

The municipality operates a burn and cover garbage dump on part of Lot 2, Concession IV. While this refuse disposal area appears satisfactory from a water pollution perspective, the York County Health Unit is unsatisfied with sanitary qualities of the site.

IV DISCUSSION OF SAMPLE ANALYSES

Samples were collected from the Maskinonge and Black rivers for bacteriological examination and chemical analyses. Of the samples collected from these rivers only one revealed the presence of a pollutant in excess of the Commission's objective. An analysis of a sample taken from the Maskinonge River and the Ravenshoe side road indicated that the 5-Day BOD of 6.3 ppm was in excess of the OWRC objective of not greater than 4 ppm.

The York County Health Unit collected samples from Lake Simcoe at prominent recreational areas. The approximate location of these sampling points are shown on the map included with this report. All of the samples collected during the summer of 1965 contained fewer coliform organisms than the OWRC maximum objective of not greater than 2,400 coliform organisms per 100 ml. Therefore the bacteriological quality as exhibited by these samples is satisfactory.

V CONCLUSIONS

At present, the measures taken by municipal officials and residents to prevent water impairment appear to have been effective. However, the highly developed areas within the township and particularly along the shoreline will probably necessitate the installation of water pollution control facilities to adequately protect these waters in the future.

Reportedly a number of proposals for the construction of sub-division type developments have been refused due to the unsuitability of the areas concerned for septic tank and subsurface tile bed installations. The only suitable solution to problems of this nature is if development is allowed, it should take place with the provision of a communal sewage works.

VI SUMMARY

A water pollution survey was made of the Township of North Gwillimbury during the summer season of 1965. Existing top soil resources and respective drainage characteristics make a large percentage of the surface area of the township unsuitable for septic tank and subsurface tile field installations.

While there is no municipal water works system, there are three private water works systems in the township. The bacteriological quality of the water supplied from all but the Miami Beach well in the Clark Water Works system is satisfactory. The Commission has recommended that the water supplied to the Miami Beach distribution

system be chlorinated for disinfection purposes.

Chemical quality of the water provided to the consumers appears satisfactory in all but the Mason Water Works System, where treatment facilities should be provided to remove iron.

Municipal residents rely on private individual sewage disposal systems. These systems are mainly of the septic tank and sub-surface tile bed type. Due to the existence of highly developed areas along the shoreline and the demand for the development of areas unsuitable for the installation of private individual sewage disposal systems, municipal authorities should give consideration to the provision of water pollution control facilities. These sewage works should be designed to service the developed area along the shoreline and in particular the Community of Keswick.

The site employed by the township for the disposal of refuse appears satisfactory from a water pollution perspective, but the York County Health Unit is unsatisfied with the sanitary qualities.

Samples collected from surface waters in the township indicate that the quality is in general satisfactory except for the 5-Day BOD of the sample, collected from the Maskinonge River at the Ravenshoe side road.

VII RECOMMENDATIONS

1. The Township of North Gwillimbury should give consideration to the installation of a sewage works to service the highly developed shoreline area.

2. The operators of the three private water works should implement the recommendations presented in the report regarding these systems.

All of which is respectfully submitted,

/elb

Approved by

C.E. McIntyre, P.Eng.,
District Engineer,
Div. of Sanitary Engineering.

Prepared by: D.A. Murray Wilson,
Engineer's Assistant.

APPENDIX

GLOSSARY OF TERMS

Bacteriological Examinations - The Membrane Filter technique is used to obtain a direct enumeration of coliform organisms. These organisms are the normal inhabitants of the intestines of man and other warmblooded animals. They are always present in large numbers in sewage and are, in general, relatively few in number in other stream pollutants. The results are reported as M.F. coliform count per 100 millilitres.

Biochemical Oxygen Demand (BOD) - The BOD test indicates the amount of oxygen required for stabilization of the decomposable organic matter found in the sewage, sewage effluent, polluted waters or industrial wastes by aerobic biochemical action. The time and temperature used are 5 days and 20°C respectively.

Solids - The analyses for solids include tests for total, suspended and dissolved solids. The former measures both the solids in solution and in suspension. Suspended solids indicate the measure of undissolved solids of organic or inorganic nature, whereas the dissolved solids are a measure of those solids in solution.

Turbidity - Turbidity is a measure of the fine suspended solids in water such as silt and finely divided organic matter. Where suspended solids values approach 20 parts per million or less, the results are usually reported as turbidity in silica units.

WATER QUALITY AND EFFLUENT OBJECTIVES

The desirable objectives for all surface waters in the Province of Ontario are as follows:

5-Day BOD	- not greater than 4 ppm
M.F. Coliform Count Median Value	- not greater than 2,400 per 100 ml.
Phenolic Equivalents - average	- not greater than 2 ppb
- maximum	- not greater than 5 ppb
pH Range	- 6.7 to 8.5

A few pertinent maximum concentration limits of contaminants in storm sewers, sewage treatment plant and industrial waste effluents are listed on the following page. It is noted that adequate protection for surface waters, except in certain specific instances influenced by local conditions, should be provided if the following concentrations and pH range are not exceeded.

5-Day BOD

Suspended Solids

Phenolic Equivalents

Ether Solubles (oil)

pH Range

- not greater than 15 ppm

- not greater than 15 ppm

- not greater than 20 ppb

- not greater than 15 ppm

- 5.5 to 10.6

TABLE I
BACTERIOLOGICAL EXAMINATION RESULTS
OF SAMPLES COLLECTED FROM LAKE SIMCOE
BY THE YORK COUNTY HEALTH UNIT

<u>Sampling Point No.</u>	<u>Description</u>	<u>Date</u>	<u>MPN per 100 c.c.</u>	
			<u>Total Coliforms</u>	<u>E. Coli</u>
S-1	Lake Simcoe at the Salvation Army Camp.	July 9, 1965	43	23
S-2	Lake Simcoe at Camp De La Salle.	July 9, 1965	6.2	0
S-3	Lake Simcoe at Willow Beach.	July 13, 1965	9.1	0
		July 19, 1965	43	23
		July 27, 1965	23	3.6
		Aug. 5, 1965	2,300	23
		Aug. 9, 1965	23	23
		Aug. 9, 1965	230	230
		Aug. 16, 1965	1,500	23
		Aug. 24, 1965	23	3.6
S-4	Lake Simcoe at North Gwillimbury Township Park.	July 13, 1965	43	43
		July 19, 1965	93	93
		July 27, 1965	23	23
		Aug. 5, 1965	43	23
		Aug. 9, 1965	39	23
		Aug. 16, 1965	0	0
		Aug. 16, 1965	23	23
		Aug. 24, 1965	23	0

TABLE I (CONT'D)

<u>Sampling Point No.</u>	<u>Description</u>	<u>Date</u>	MPN per 100 c.c.	
			<u>Total Coliforms</u>	<u>E. Coli</u>
S-5	Lake Simcoe at Balfour Beach (Roches Point).	July 13, 1965	43	0
		July 19, 1965	930	930
		July 27, 1965	39	0
		Aug. 5, 1965	230	0
		Aug. 9, 1965	2,300	160
		Aug. 19, 1965	43	0
		Aug. 24, 1965	150	23
S-6	Lake Simcoe at Keffer's Beach (Keswick).	July 13, 1965	23	23
		July 19, 1965	230	230
		July 27, 1965	23	0
		Aug. 5, 1965	210	23
		Aug. 9, 1965	750	23
		Aug. 24, 1965	150	23
S-7	Cook Bay at Glenwood Beach.	July 26, 1965	23	23
S-8	Cook Bay at Miami Beach.	July 19, 1965	430	430
		Aug. 3, 1965	230	23
		Aug. 9, 1965	750	230
		Aug. 23, 1965	930	0

TABLE II
MASKINONGE AND BLACK RIVERS

SAMPLE RESULTS

<u>Sampling Point No.</u>	<u>Description</u>	<u>Date</u>	<u>5-Day BOD (ppm)</u>	<u>Total (ppm)</u>	<u>Solids Susp. (ppm)</u>	<u>Diss. (ppm)</u>	<u>M.F. Coliform Count/100 ml</u>
M-0.2	Maskinonge River at the Queensway Road Bridge (Keswick).	Sept.21/65	3.7	242	5	237	1,200
M-4.0	Maskinonge River at the Ravenshoe Side Road 25 miles east of Don Mills.	Sept.12/65	6.3	526	16	510	200
BR-6.2	Black River at Side Road.25 miles west of Baldwin	Sept.12/65	1.5	130	1	129	400

TABLE III

OUTFALL

<u>Sampling Point No.</u>	<u>Description</u>	<u>Date</u>	
S-6 W	24-Inch Diameter Con- crete Storm Sewer at Church St. and Metropolitan Crescent.	Sept.2/65	No Flow Noted.